Adult Immunizations:
Running A Successful Adult Program

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Learning Objectives

- Identify the disease processes and the dosing regimens for selected adult vaccines
- Learn techniques to increase delivery rates of these vaccines in an ambulatory setting
- Overcome common barriers to vaccine delivery

Healthy People 2020: Immunization and Infectious Diseases

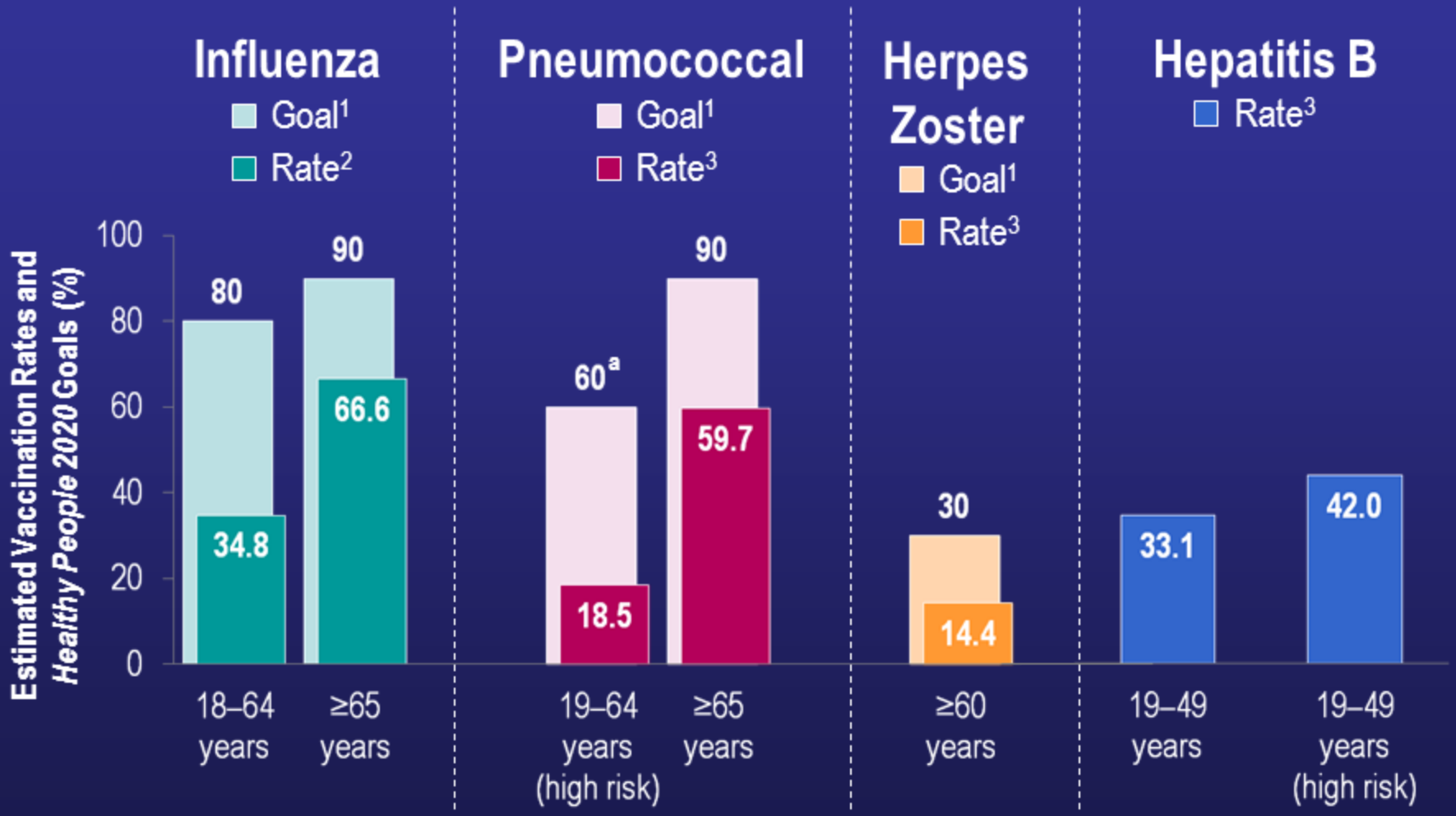
GOAL

Increase vaccination rates and reduce preventable infectious diseases[1]

- Objectives related to adult vaccination rates[2]
  - Increase the percentage of adults who are vaccinated against:
    - Influenza
    - Pneumococcal disease
    - Herpes zoster (shingles)
    - Hepatitis B (high-risk individuals)

1. US Department of Health and Human Services. healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=23. Accessed April 13, 2012.
2. US Department of Health and Human Services. healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives.pdf. Accessed April 13, 2012.

Select Adult Vaccination Rates, 2010



[a]Goal for persons 18 to 64 years of age.

1. US Department of Health and Human Services. healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives.pdf. Accessed May 14, 2012.
2. Centers for Disease Control and Prevention (CDC). Final state specific influenza vaccination coverage estimates for the 2010–11 season—United States, National Immunization Survey and Behavioral Risk Factor Surveillance System, August 2010 through May 2011. cdc.gov/flu/professionals/vaccination/coverage_1011estimates.htm. Accessed April 13, 2012.
3. CDC. *MMWR*. 2012;61:61–80.

Influenza Transmission

- Spread via respiratory droplets from person to person[1]
  - Cough
  - Sneeze
- Contaminated surfaces[1]
- Incubation period (1 to 4 days)[1,2]
- Period of communicability[1,2]

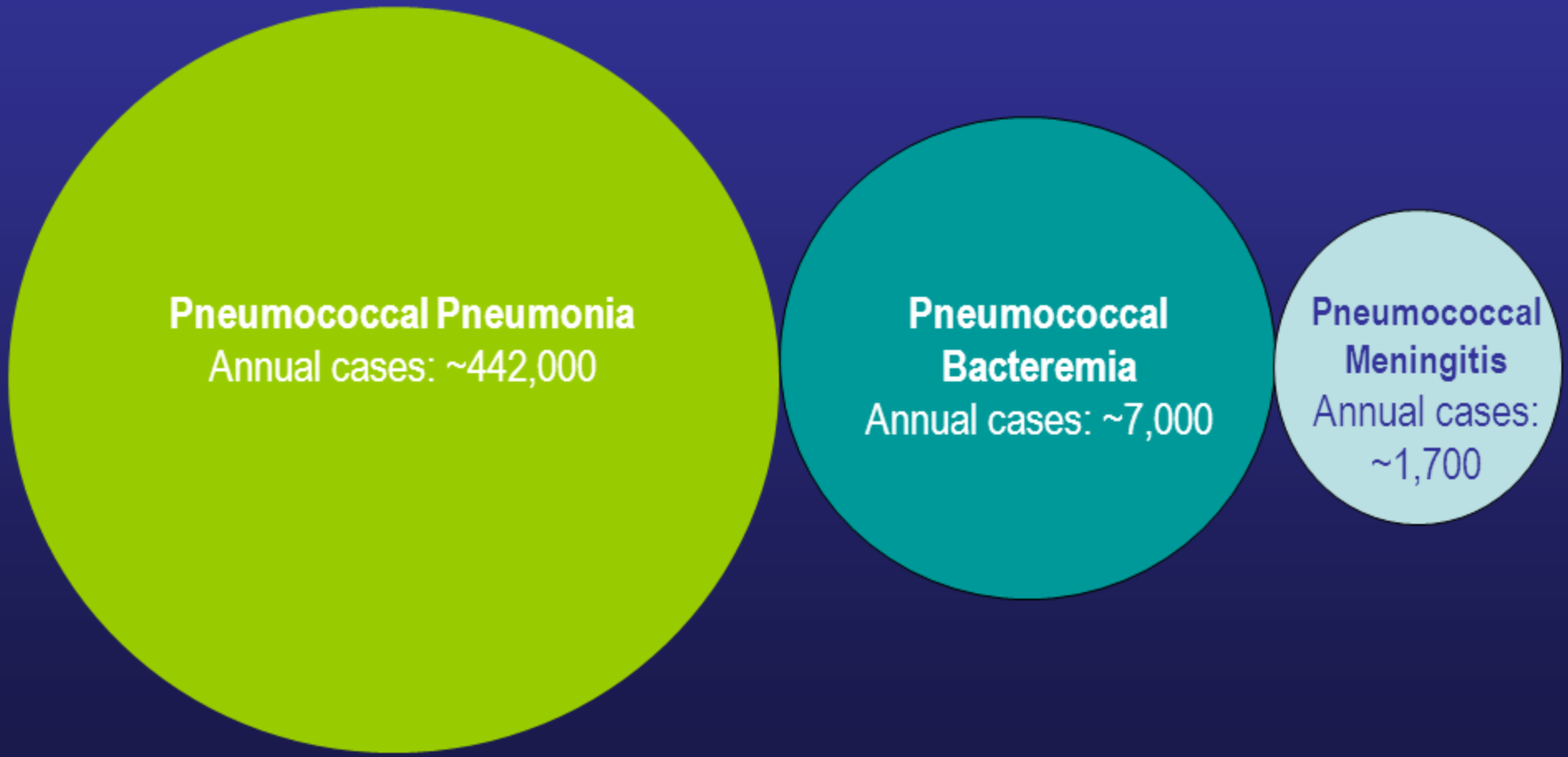
1. Centers for Disease Control and Prevention. *MMWR Recomm Rep.* 2008;57(RR-7):1–64.
2. American Public Health Association. *Control of Communicable Disease Manual.* getreadyforflu.org/CCDMInfluenza.pdf. Accessed April 15, 2012.

Influenza Complications[1]

Pulmonary Complications	Non-Pulmonary Complications
▪ Viral pneumonia	▪ Myositis
▪ Secondary bacterial pneumonia	▪ Rhabdomyolysis
▪ Pneumonia due to unusual pathogens	▪ Myocarditis
▪ Exacerbations of preexisting chronic pulmonary diseases	▪ Pericarditis
	▪ Encephalomyelitis
	▪ Guillain-Barré Syndrome
	▪ Reye's Syndrome
	▪ Transverse myelitis
	▪ Aseptic meningitis
	▪ Focal neurologic disorders

1. Rothberg MB et al. *Am J Med.* 2008;121:258–264.

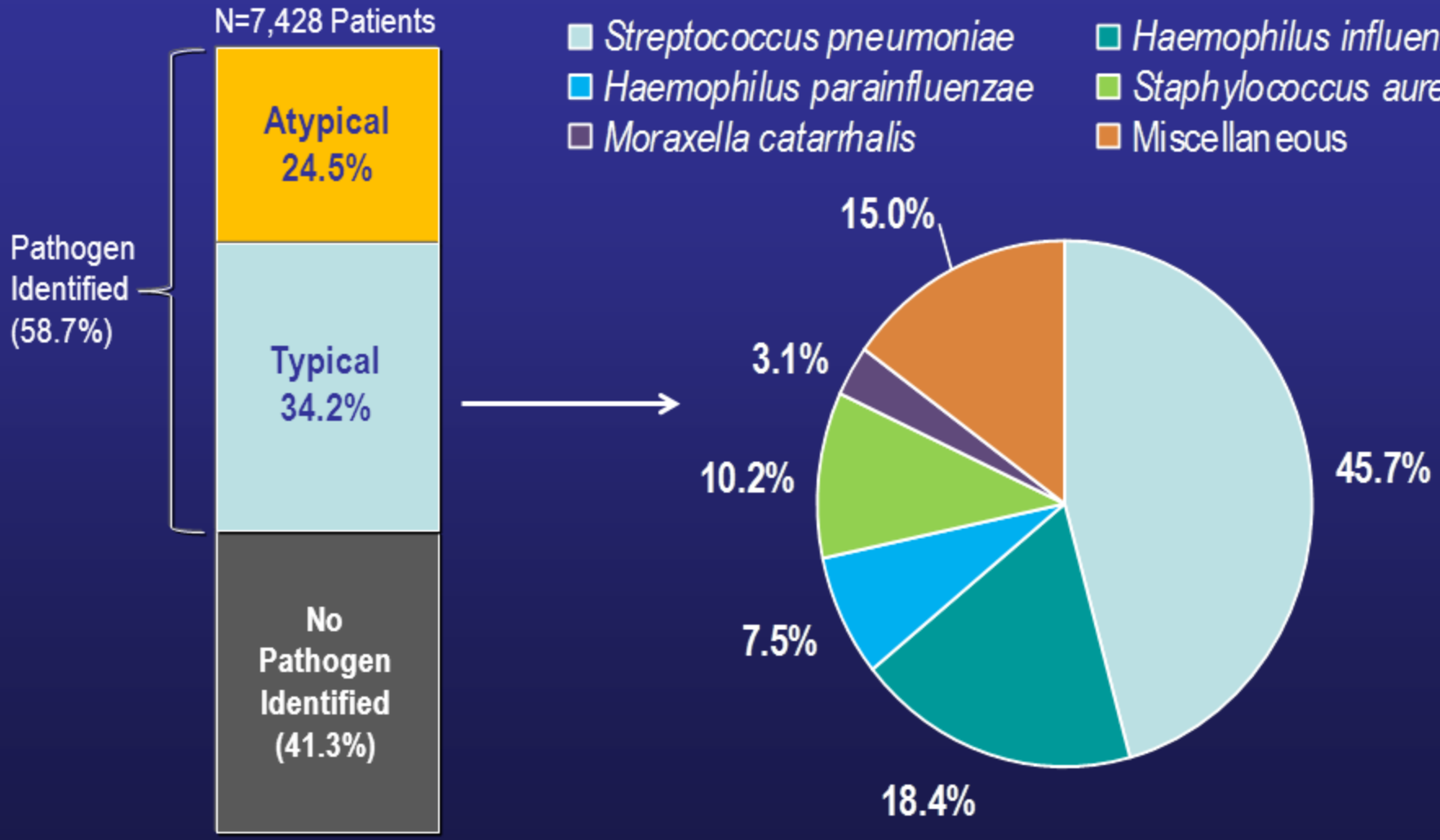
Overview of Major Clinical Manifestations of Pneumococcal Disease in Adults ≥50 Years in the United States[1,a]



1. Huang SS et al. *Vaccine*. 2011;29:3398–3412. Adapted from *Vaccine*, Vol 29, Huang SS et al, Healthcare utilization and cost of pneumococcal disease in the United States, 3398–3412, © 2011, with permission from Elsevier.

[a]Estimates of clinical manifestations obtained in 2004. The graphic is not drawn to scale.

Etiology of Community-Acquired Pneumonia[1,a]

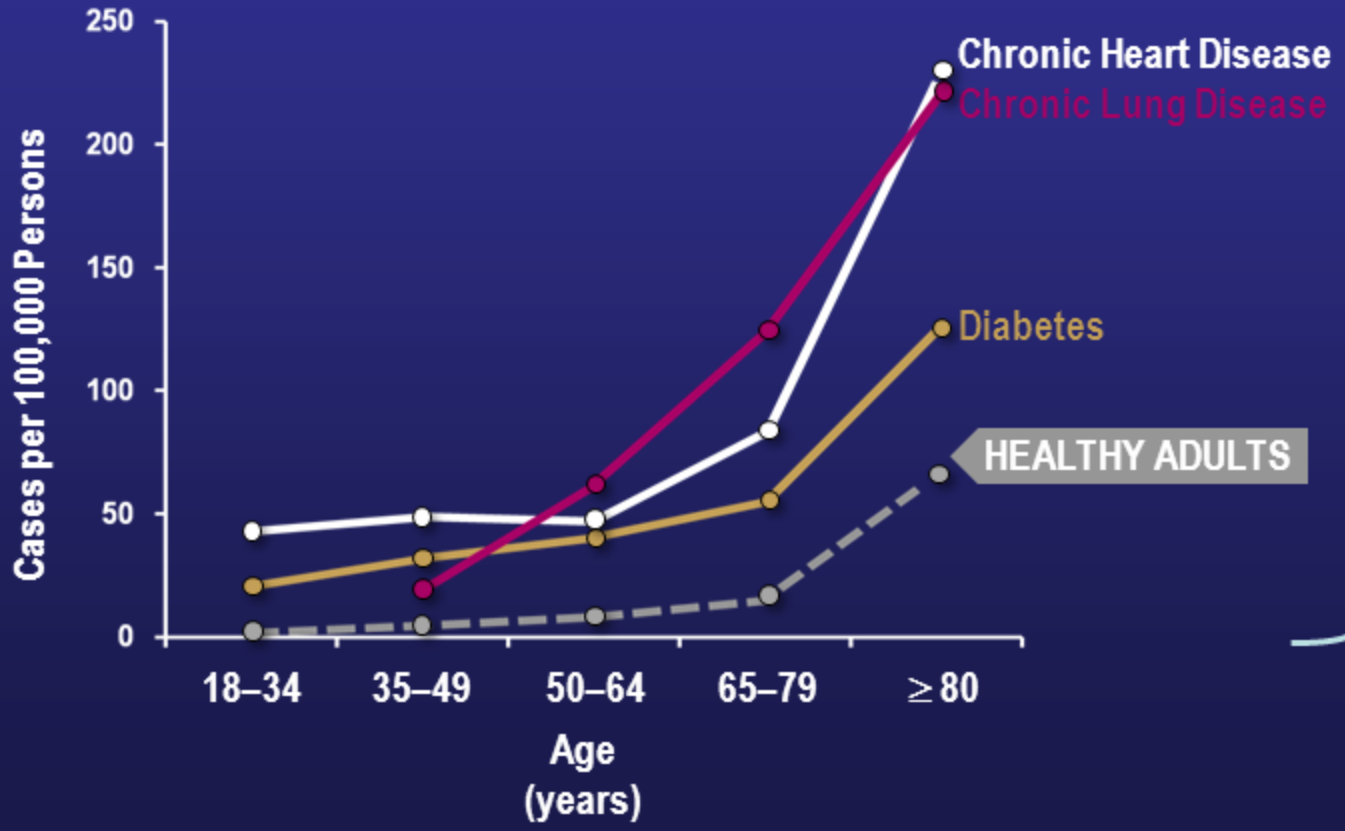


[a]Review of 16 studies published from 1996 to 2007. The pie chart represents the breakdown of typical pathogens.

1. Echols RM et al. *Clin Infect Dis.* 2008;47(Suppl 3):S166–S175.

The Incidence Rate of Pneumococcal Disease Increases With Age and With Certain Chronic Conditions[1]

Incidence Rate of IPD, United States (1999–2000)



Increased relative risk for IPD with comorbidities:

3- to 6-fold higher in adults with these comorbidities vs healthy adults

Higher IPD rate in person ≥50 years of age:

2.9-fold higher vs. adults <50 years old ($P<0.0001$)

IPD=invasive pneumococcal disease.

1. Kyaw MH et al. *J Infect Dis.* 2005;192:377–386.

Serotypes Contained in PCV13 and PPSV23

PCV13=13-valent pneumococcal conjugate vaccine; PPSV23=23-valent pneumococcal polysaccharide vaccine.

New Pneumococcal Vaccine Recommendations

- Adults 65+, unknown status or no vaccine
- Adults 65+, previous PPSV 23
- Adults <65, previous PPSV 23

Hepatitis B: Burden of Disease

- Hepatitis B virus (HBV) causes acute and chronic infection of the liver leading to substantial morbidity and mortality.[1]
- Case-fatality rate among persons with acute HBV is 0.5% to 1% and is highest in those >60 years of age.[2]
- Acute infection progresses to chronic infection in ~5% of adults.[1,2]
- An estimated 800,000 to 1.4 million persons in the United States have chronic HBV infection.[3]
- The burden of chronic infection is greatest among certain at-risk populations.[2,3]
- Approximately 15% of adults with chronic HBV infection die prematurely from cirrhosis or liver cancer.[1,2]

1. Centers for Disease Control and Prevention (CDC). *MMWR Recomm Rep.* 2011;60:1709–1711. **2.** CDC. *MMWR Recomm Rep.* 2006;55(RR-16):1–33. **3.** CDC. *MMWR Recomm Rep.* 2008;57(RR-8):1–20.

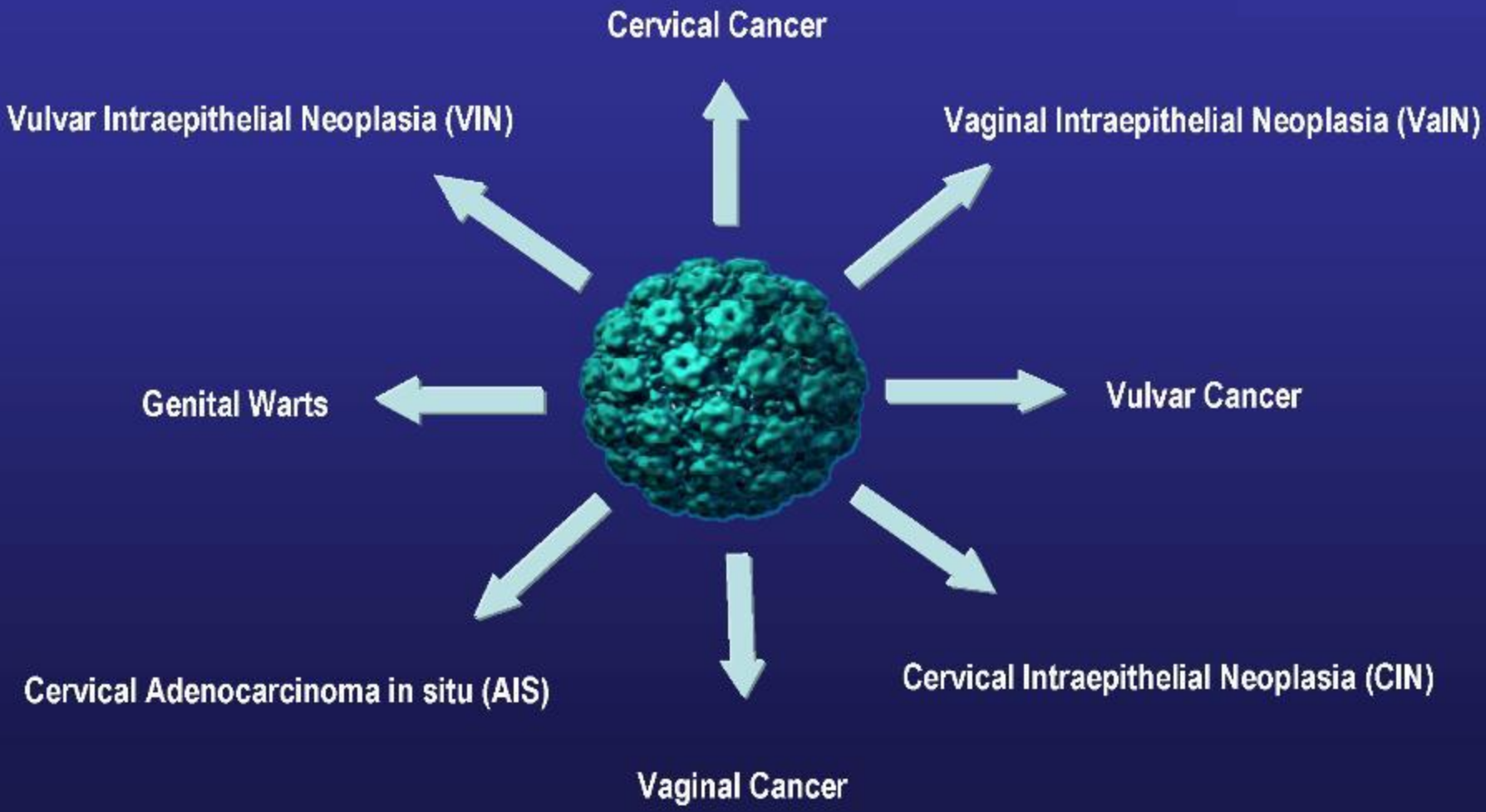
Adults Recommended to Receive Hepatitis B Vaccination[1]

Persons at Risk for Infection by Sexual Exposure	Persons at Risk for Infection by Percutaneous or Mucosal Exposure to Blood	Others
▪ Sex partners of HBsAg-positive persons ▪ Persons who have had >1 sex partner during the previous 6 months ▪ Persons seeking evaluation or treatment for a sexually transmitted disease ▪ Men who have sex with men	▪ Current or recent injection-drug users ▪ Household contacts of HBsAg-positive persons ▪ Residents or staff in facilities for developmentally disabled persons ▪ Health care and public safety workers who may be exposed to blood or blood-contaminated body fluids ▪ Persons with end-stage renal disease	▪ International travelers to regions with high or intermediate levels of endemic HBV infection ▪ Persons with chronic liver disease ▪ Persons with HIV infection ▪ All other persons seeking protection from HBV infection

HBsAg=hepatitis B surface antigen; HBV=hepatitis B virus; HIV=human immunodeficiency virus.

1. Centers for Disease Control and Prevention (CDC). *MMWR Recomm Rep*. 2006;55(RR-16):1–33.

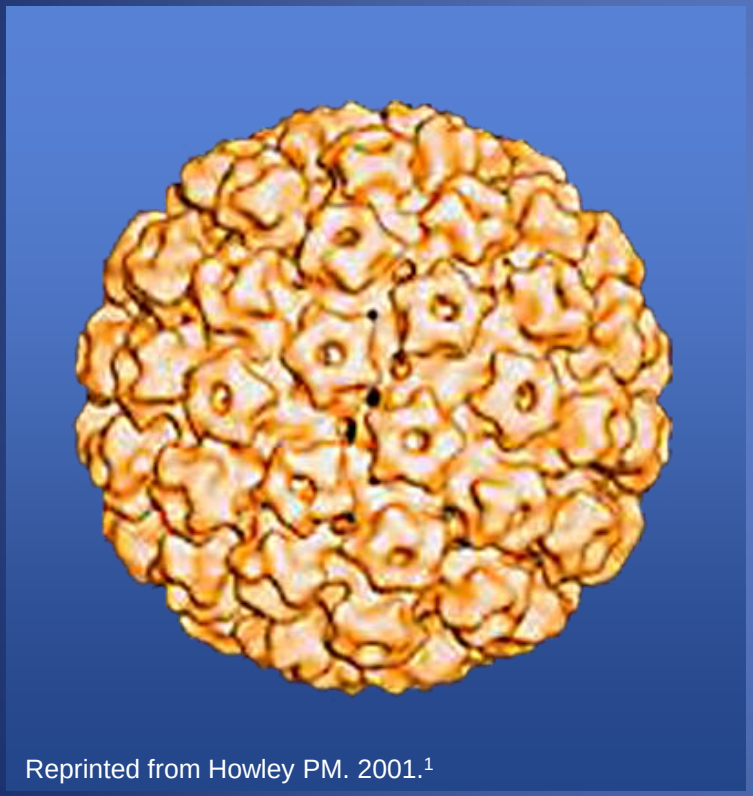
HPV Is Associated With Many Conditions[1]



1. Braaten KP et al. *Rev Obstet Gynecol.* 2008;1(1):2–10.

HPV

Nonenveloped double-stranded DNA virus[1]



Reprinted from Howley PM. 2001.[1]

- >100 types identified[2]
- 30–40 anogenital[2,3]
  - 15–20 oncogenic*[,2,3] types, including 16, 18, 31, 33, 35, 39, 45, 51, 52, 58[4]
    - HPV 16 (54%) and HPV 18 (13%) account for the majority of worldwide cervical cancers.[5]
  - Nononcogenic† types include: 6, 11, 40, 42, 43, 44, 54[4]
    - HPV 6 and 11 are most often associated with external anogenital warts.[3]

*High risk; †Low risk

1. Howley PM. In: Fields BN, Knipe DM, Howley PM, eds. *Fields Virology.* 4th ed. Philadelphia, Pa: Lippincott-Raven; 2001:2197–2229. Reprinted with the permission of Lippincott-Raven. 2. Schiffman M, Castle PE. *Arch Pathol Lab Med*. 2003;127:930–934. 3. Wiley DJ, Douglas J, Beutner K, et al. *Clin Infect Dis*. 2002;35(suppl 2):S210–S224. 4. Muñoz N, Bosch FX, de Sanjosé S, et al. *N Engl J Med*. 2003;348:518–527. 5. Clifford GM, Smith JS, Aguado T, Franceschi S. *Br J Cancer*. 2003:89;101–105.

HPV and Cancer: A Broader Picture[1]

Cancer	% Associated With Certain HPV Types
Cervical*	≥95%
Vaginal*	50%
Vulvar*	>50%
Penile	50%
Anal	>70%
Oropharyngeal	20%
Nonmelanoma skin/cutaneous squamous cell	90%†

*Includes cancer and intraepithelial neoplasia
†Immunocompromised patients
1. González Intxaurraga MA, Stankovic R, Sorli R, Trevisan G. *Acta Dermatovenerol.* 2002;11:1–8.

US HPV Statistics

- Lifetime risk for sexually active men and women is at least 50%.[1]
  - By 50 years of age, at least 80% of women will have acquired genital HPV infection.[1]
- Estimated incidence: 6.2 million per year[1]
- Estimated prevalence: 20 million[2]
- In sexually active individuals 15–24 years of age, ~9.2 million are currently infected.[3]
  - An estimated 74% of new HPV infections occur in this age group.[3]
  - In studies of women <25 years of age, prevalence rates ranged from 28% to 46%.[4,5]

1. Centers for Disease Control and Prevention. Rockville, Md: CDC National Prevention Information Network; 2004. 2. Cates W Jr, and the American Social Health Association Panel. *Sex Transm Dis*. 1999;26(suppl):S2–S7. 3. Weinstock H, Berman S, Cates W Jr. *Perspect Sex Reprod Health*. 2004;36:6–10. 4. Burk RD, Ho GYF, Beardsley L, Lempa M, Peters M, Bierman R. *J Infect Dis*. 1996;174:679–689. 5. Bauer HM, Ting Y, Greer CE, et al. *JAMA*. 1991;265:472–477.

Mechanisms of HPV Transmission and Acquisition

- Sexual contact
  - Through sexual intercourse[1]
    - Including anal intercourse
  - Genital–genital, manual–genital, oral–genital[2–4]
  - Genital HPV infection in virgins is rare, but may result from nonpenetrative sexual contact.[2]
  - If used correctly, condoms can help reduce the risk of HPV infection. However, the level of protection from HPV infection with condom use has not yet been determined.[5]
- Nonsexual routes
  - Mother to newborn (vertical transmission; rare)[6]
  - Fomites (eg, undergarments, surgical gloves, biopsy forceps)[7,8]
    - Hypothesized but not well documented
- Most infected individuals are unaware that they are infected and may unknowingly spread the virus.[9]

1. Kjaer SK, Chackerian B, van den Brule AJC, et al. *Cancer Epidemiol Biomarkers Prev*. 2001;10:101–106. **2.** Winer RL, Lee S-K, Hughes JP, Adam DE, Kiviat NB, Koutsky LA. *Am J Epidemiol*. 2003;157:218–226. **3.** Fairley CK, Gay NJ, Forbes A, Abramson M, Garland SM. *Epidemiol Infect*. 1995;115:169–176. **4.** Herrero R, Castellsagué X, Pawlita M, et al. *J Natl Cancer Inst*. 2003;95:1772–1783. **5.** Centers for Disease Control and Prevention. Rockville, Md: CDC National Prevention Information Network; 2004. **6.** Smith EM, Ritchie JM, Yankowitz J, et al. *Sex Transm Dis*. 2004;31:57–62. **7.** Ferenczy A, Bergeron C, Richart RM. *Obstet Gynecol*. 1989;74:950–954. **8.** Roden RBS, Lowy DR, Schiller JT. *J Infect Dis*. 1997;176:1076–1079. **9.** Anhang R, Goodman A, Goldie SJ. *CA Cancer J Clin.* 2004;54:248–259.

Risk Factors for HPV Infection

Women

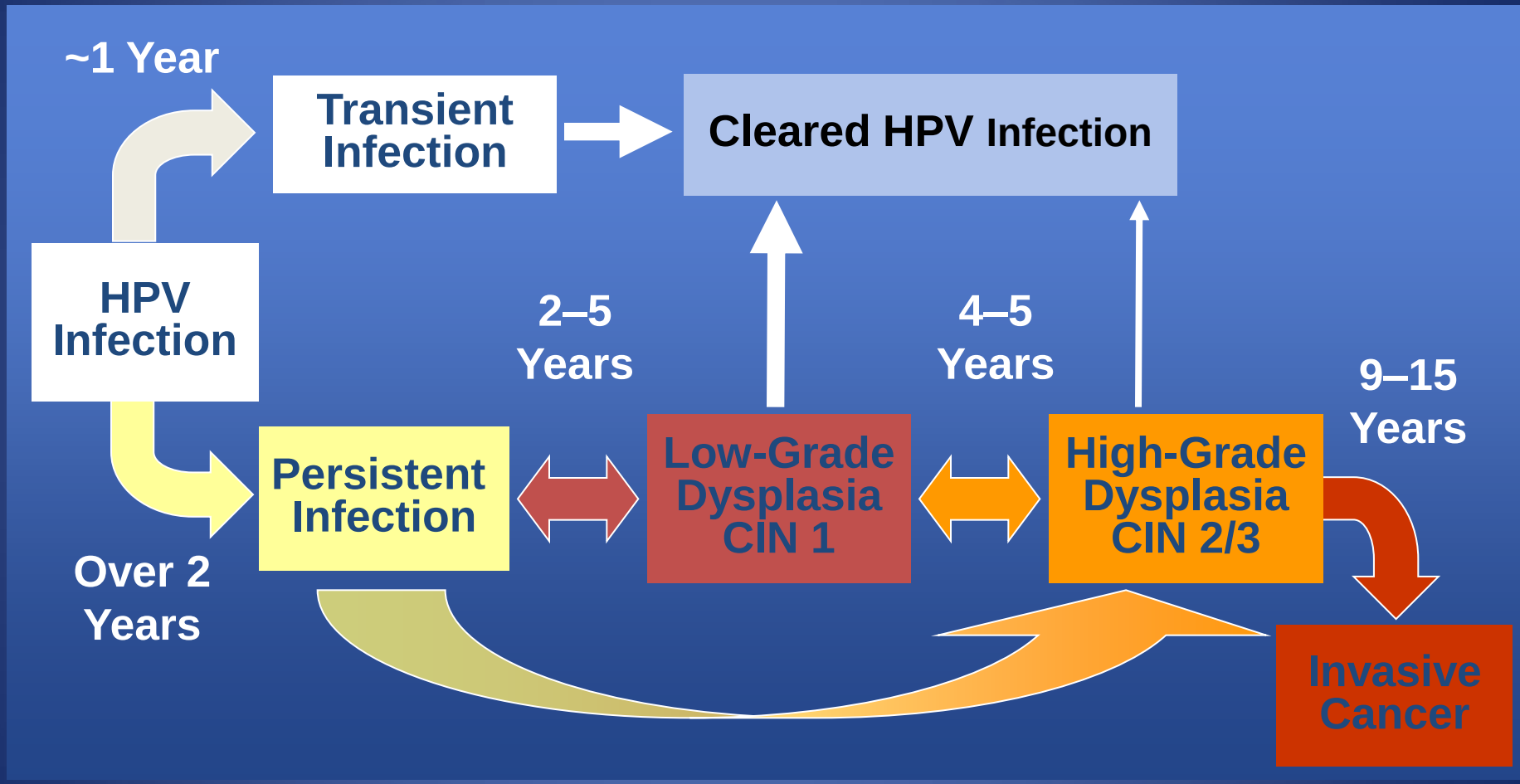
- Young age (peak age group 20–24 years of age)[1]
- Lifetime number of sex partners[2]
- Early age of first sexual intercourse[3]
- Male partner sexual behavior[3]
- Smoking[4]
- Oral contraceptive use[4]
- Uncircumcised male partners[5]

Men

- Young age (peak age group 25–29 years of age)[1]
- Lifetime number of sex partners[6]
- Being uncircumcised[6]

1. Insinga RP, Dasbach EF, Myers ER. *Clin Infect Dis.* 2003;36:1397–1403. 2. Burk RD, Ho GYF, Beardsley L, Lempa M, Peters M, Bierman R. *J Infect Dis*. 1996;174:679–689. 3. Murthy NS, Mathew A. *Eur J Cancer Prev*. 2000;9:5–14. 4. Winer RL, Lee S-K, Hughes JP, Adam DE, Kiviat NB, Koutsky LA. *Am J Epidemiol*. 2003;157:218–226. 5. Schiffman M, Castle PE. *Arch Pathol Lab Med*. 2003;127:930–934. 6. Svare EI, Kjaer SK, Worm AM, Osterlind A, Meijer CJLM, van den Brule AJ. *Sex Transm Infect*. 2002;78:215–218.

Natural History of High-Risk HPV Infection and Potential Progression to Cervical Cancer[1,2]



Adapted from: 1. Pagliusi SR, Aguado MT. *Vaccine*. 2004;23:569–578. 2. Pinto AP, Crum CP. Clin Obstet Gynecol. 2000;43:352–362.

HPV Clearance

- In women 15–25 years of age, ~80% of HPV infections are transient.[1]
  - Gradual development of cell-mediated immune response presumed mechanism[2]
- In a study of 608 college women, 70% of new HPV infections cleared within 1 year and 91% within 2 years.[3]
  - Median duration of infection = 8 months[3]
  - Certain HPV types are more likely to persist (eg, HPV 16 and HPV 18)

1. Meijer CJLM, Helmerhorst TJM, Rozendaal L, van der Linden JC, Voorhorst FJ, Walboomers JMM. *Histopathology*. 1998;33:83–86. 2. Schiffman M, Kjaer SK. *J Natl Cancer Inst Monogr*. 2003;31:14–19. 3. Ho GYF, Bierman R, Beardsley L, Chang CJ, Burk RD. *N Engl J Med*. 1998;338:423–428.

HPV and Anogenital Warts

Genital warts

- HPV 6 and 11 responsible for >90% of anogenital warts[1]
- Infectivity >75%[2]
- Up to 30% spontaneously regress within 4 months.[3]
- Treatment can be painful and embarrassing.[4]
- Topical and surgical therapies are available for genital warts.[5]
- Recurrence rates vary greatly.[5]
  - As low as 5% with podofilox or laser treatment
  - As high as 65% with other treatments

1. Jansen KU, Shaw AR. Annu Rev Med. 2004;55:319–331. 2. Soper DE. In: Berek JS, ed. *Novak's* Gynecology. 13th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2002:453–470. 3. Lacey CJN. *J Clin Virol*. 2005;32(suppl):S82–S90. 4. Maw RD, Reitano M, Roy M. *Int J STD AIDS.* 1998;9:571–578. 5. Kodner CM, Nasraty S. *Am Fam Physician.* 2004;70:2335–2342.

Cervical Intraepithelial Neoplasia (CIN)[1]

CIN 1

CIN 2

CIN 3

- CIN Stages[2]
  - CIN 1: Mild dysplasia
  - CIN 2: Moderate dysplasia
  - CIN 3: Severe dysplasia; includes carcinoma in situ (CIS)

1. Reprinted with permission from Dr. JW Sellors & Dr. R Sankaranarayanan. Sellors JW et al, eds. Lyon, France: International Agency for Research on Cancer;2003. *Colposcopy and Treatment of Cervical Intraepithelial Neoplasia. A Beginner's Manual.* Reprinted with permission of the International Agency for Research on Cancer, World Health Organization. 2. Bonnez W et al. In: Richman DD et al, eds. *Clinical Virology.* 2nd edition. American Society for Microbiology, Washington, NY. 2002:569--611.

HPV-associated conditions
HPV types 16, 18, 6, 11

- HPV 16, 18
  - Low/High grade intraepithelial neoplasias
  - Cervical cancers
  - Anal cancers
  - Vulvar/vaginal cancers
  - Penile cancers
  - Oropharyngeal cancers
- HPV 6, 11
  - Low grade intraepithelial neoplasias
  - Genital warts
  - Recurrent respiratory papillomatosis (RRP)

Clifford GM, BJ Ca 2003, Munoz Int J Cancer 2004; Brown J Clin Micro 1993; Carter Cancer Res 2001;
Clifford Cancer Epi Biomarkers Prev 2005; Gissman Proc Natl Acad Science 1983;
Kreimer Cancer Epidemiol Biomarkers Prev. 2005,
Insinga RP et al. American Journal of Obstetrics and Gynecology 2004

Why Early Vaccination?

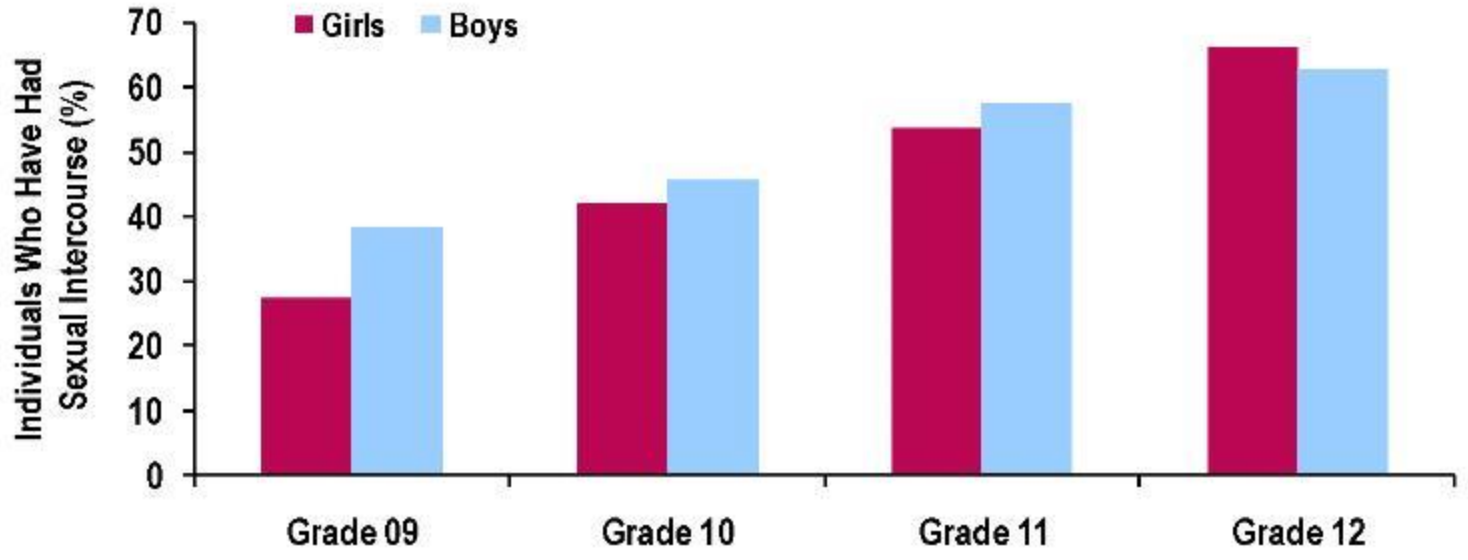
- Important to reach younger adolescents prior to exposure
- Adolescent females may have increased susceptibility to HPV infection[1-3]
- Timing opportunity: young children (9 to 12 years old) have more frequent contact with health care provider (pediatrician) than older adolescents (>13 years old)[4]
- Adolescents are sexually active[5]
  - Nationwide, 7.4% of the students had sexual intercourse for the first time before age 13 years.
  - Overall, the prevalence of female students having sexual intercourse before age 13 years was 4.2%.[5]

1. Kahn JA. *Curr Opin Pediatr*. 2001;13:303–309. 2. Rager KM, Kahn JA. *Curr Women Health Rep*. 2002;2:468–475. 3. ACOG Committee on Adolescent Health Care. Obstet Gynecol. 2004;104:891–898. 4. Oster NV, Phillips-Tangum CA, Averhoff F, et al. *J Am Board Fam Pract*. 2005;18:13–19. 5. Grunbaum JA, Kann L, Kinchen S, et al. *MMWR*. 2004;53(SS-2):1–96.

Sexual Activity Among US High School Students[1]

Centers for Disease Control and Prevention 2007 US Youth Risk Behavior Survey (N = 14,103)[1]

Percentage of US High School Students Who Have Had Sexual Intercourse[2]



7.1% of US adolescents reported sexual debut before age 13[1,2]

14.9% of US adolescents reported ≥ 4 lifetime sexual partners by Grade 12[1,2]

1. Eaton DK et al. *MMWR Surveill Summ.* 2008;57(SS04):1–131. **2.** Gavin L et al. *MMWR Surveill Summ.* 2009;58(SS06):1–58.

Facilitating Communication With Parents Through Shared Decision Making

- Initiate conversation about parental concerns or questions.[1]
- Provide relevant information about the clinical decision, alternatives, risks, and benefits.[2]
  - Education on the potential seriousness of HPV-related diseases.[3]
  - Discussion of the efficacy, safety, precautions, contraindications, and common side effects of the quadrivalent HPV vaccine.[3]
- Elicit information about beliefs, concerns, knowledge, and preferences.[2]
  - Be respectful of opinions, including those based on misinformation—people whose views are discussed are more likely to consider corrective information.[1]
- Enable the parent to feel empowered to make an informed decision.[1]
- Re-initiate conversation as needed.

1. Zimet GD. *J Adolesc Health.* 2005;37(suppl 6):S17–S23. **2.** Anhang R et al. *CA Cancer J Clin* 2004;54(5):248–259. **3.** Kahn JA et al. *Obstet Gynecol.* 2008;111 (5):1103-1110.

Limitations of Risk-Based Vaccination Strategies

- Risk-based vaccination strategy:
  - Using behavioral risk factors (primarily sexual history) to identify populations most suitable for HPV vaccination.[1]
- Study conclusion: risk stratification is not a viable strategy for HPV vaccination of young adults.[1]
  - An estimated 25% to 80% of eligible young women who could benefit from vaccination would be excluded using a risk-factor–based approach.

"[It is not possible for a clinician to assess the extent to which sexually active persons would benefit from vaccination, and the risk for HPV infection might continue as long as persons are sexually active."[2]

— ACIP

ACIP= Advisory Committee on Immunization Practices.

1. Dempsey AF et al. *Vaccine.* 2008;26(8):1111–1117. **2.** Centers for Disease Control and Prevention (CDC). *MMWR Recomm Rep.* 2007;56(RR-2):1–24.

Perceived Challenges to Adult Vaccination: Survey[1,a]

Patient Reasons

- *"Doctor hasn't told me I need it."*
- Not knowing when to get it.
- The belief that a healthy person doesn't need it.
- Financial concerns were not a deterrent for most.

Health Care Provider Perceptions

- Side effects.
- Dislike of needles.
- Lack of insurance coverage.
- Lack of knowledge about disease prevention.

Most patients indicated that they were likely to receive a vaccination if their health care provider recommended it.

[a]A recent survey was conducted to identify the reasons adult patients may decide to **NOT** receive vaccinations and health care providers' perceptions regarding patients' **NOT** being vaccinated.
Consumers (N = 2,002) and health care providers (N = 200) completed structured telephone interviews, e-mails, or faxes emphasizing tetanus, influenza, and pneumococcal vaccines.

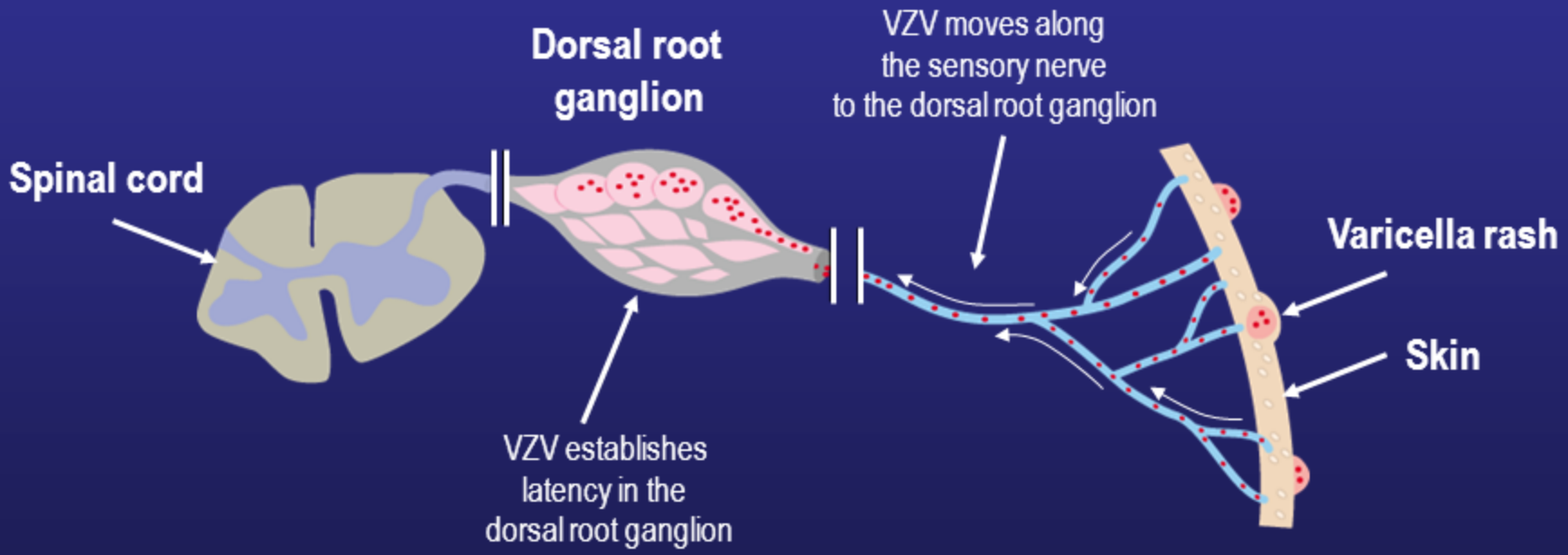
1. Johnson DR et al. *Am J Med.* 2008;121(7 suppl 2):S28–S35.

The Aging Population and the Importance of Preventive Care

- Currently, about 80% of older adults are living with at least 1 chronic condition.[1]
  - 50% of older adults have at least 2 chronic conditions.[1]
- Infectious diseases take a disproportionate toll on older adults.[1]
  - Age is an independent risk factor for several infectious diseases, including influenza, pneumococcal disease, and shingles.[2–4]
- Increasing the use of clinical preventive services is a priority.[1,5]
- By 2030, there will be 71 million adults ≥65 years of age, accounting for ~20% of the US population.[5]
- Health care spending is projected to increase by 25% because of this demographic shift.[5]

1. Centers for Disease Control and Prevention (CDC). Healthy Aging: Helping People to Live Long and Productive Lives and Enjoy a Good Quality of Life: At a Glance 2011. cdc.gov/chronicdisease/resources/publications/aag/pdf/2011/Healthy_Aging_AAG_508.pdf. Accessed April 23, 2012. **2.** CDC. *MMWR Recomm Rep.* 2008;57(RR-7):1–64. **3.** CDC. *MMWR Recomm Rep.* 1997;46(RR 8):1–24. **4.** Harpaz R et al. *MMWR Recomm Rep.* 2008;57(RR–5):1–30. **5.** CDC and The Merck Company Foundation. The State of Aging and Health in America 2007. cdc.gov/aging/pdf/saha_2007.pdf.

Herpes Zoster Is Caused By Reactivation of a Latent Varicella-Zoster Virus Infection[1]



VZV=varicella-zoster virus.

Image adapted from Johnson RW. *Expert Rev Vaccines.* 2010;9(3 Suppl):21–26.

1. Straus SE et al. In: Freedberg IM et al, eds. *Fitzpatrick's Dermatology in General Medicine.* 5th ed. Vol 2. McGraw-Hill; 1999:2427–2450.

Herpes Zoster Rash: Dermatomal Distribution

© Dr. P. Marazzi / Photo Researchers, Inc

© Phototake.

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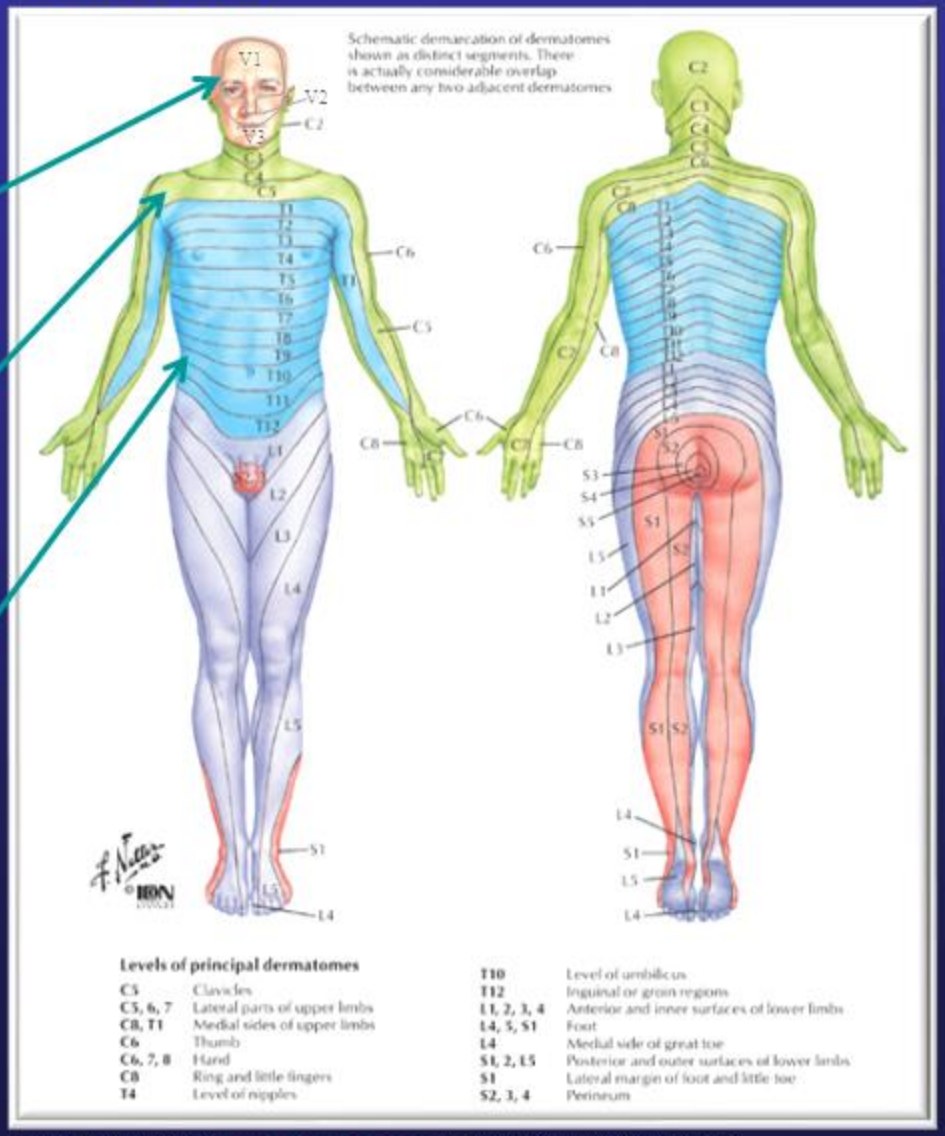

Adapted from http://www.backpain-guide.com/Chapter_Fig_folders/Ch06_Path_Folder/4Radiculopathy.html

Herpes Zoster Risk and Incidence

- The risk for zoster is high in the United States.[1]
  - About 99.5% of adults ≥40 years of age are at risk for zoster because they have serologic evidence of the VZV.
- Incidence and severity of zoster increases with age.[1,2]
  - Of the estimated 1 million cases per year,[1,3] approximately 70% occur in adults ≥50 years of age.[4]
  - By 85 years of age, approximately 50% of individuals will have had zoster.[1,5]

According to the CDC, approximately

1 in 3 people will develop zoster in their lifetime[1]

VZV=varicella-zoster virus.

1. Harpaz R et al. *MMWR Recomm Rep*. 2008;57(RR–5):1–30. **2.** Oxman MN et al. *N Engl J Med*. 2005;352:2271–2284. **3.** Insinga RP et al. *J Gen Intern Med*. 2005;20:748–753. **4.** Pappagallo M et al. *CNS Drugs*. 2003;17:771–780. **5.** Schmader KE. *Clin Infect Dis*. 2001;32:1481–1486.

Complications of Herpes Zoster

- Neurologic[1,2]
  - Postherpetic neuralgia (PHN) most common
    - ↳ Occurs in 10% to 18% of patients with zoster
  - Loss of sensation, allodynia, cranial and motor neuron palsies, meningoencephalitis, hearing loss, vertigo, and Ramsey Hunt Syndrome
- Ophthalmic[1,2]
  - Herpes zoster ophthalmicus (HZO)
    - ↳ Occurs in 10% to 25% of patients with zoster
    - Visual impairment, ptosis, pain, facial scarring
    - Keratitis
      - ↳ Occurs in about two-thirds of patients with HZO
- Cutaneous[2]
  - Scarring, bacterial superinfection
- Disseminated[2]
  - More likely in immunocompromised patients

Not an actual patient

Pavan-Langston D, Ophthalmic zoster, In: Arvin AM, Gershon AA, eds, *Varicella-Zoster Virus: Virology and Clinical Management*, 276–298,

1. Harpaz R et al. *MMWR Recomm Rep*. 2008;57(RR–5):1–30.
2. Oxman MN. *Varicella-Zoster Virus: Virology and Clinical Management*. Cambridge University Press;2000:246–275.

ACIP Recommendations for Use of ZOSTAVAX® (Zoster Vaccine Live)

No Recommendation for Adults Aged 50–59 Years[1]	Recommendations for Adults Aged ≥60 Years[2]	Recommendations for Special Groups and Circumstances[2]
▪ In June 2011, the ACIP reviewed all available evidence on long-term protection, cost-effectiveness and vaccine supply, and declined to vote on the use of ZOSTAVAX in adults aged 50 through 59 years.	▪ ACIP recommends routine vaccination of all persons aged ≥60 years with 1 dose of zoster vaccine.	▪ Deferral of vaccination should be considered in acute illness.

ACIP=Advisory Committee on Immunization Practices

[a]For example, chronic renal failure, diabetes mellitus, rheumatoid arthritis, and chronic pulmonary disease.

1. Centers for Disease Control and Prevention (CDC). *MMWR Recomm Rep.* 2011;60:1528.

2. Harpaz R et al. *MMWR Recomm Rep.* 2008;57(RR–5):1–30.

Important Information About ZOSTAVAX® (Zoster Vaccine Live)

- ZOSTAVAX is a live attenuated virus vaccine indicated for prevention of herpes zoster (shingles) in individuals 50 years of age and older. ZOSTAVAX is not indicated for the treatment of zoster or postherpetic neuralgia. ZOSTAVAX should not be used for prevention of primary varicella infection (Chickenpox).

Select Safety Information

- Vaccination with ZOSTAVAX does not result in protection of all vaccine recipients.
- ZOSTAVAX is contraindicated in: persons with a history of anaphylactic or anaphylactoid reaction to gelatin, neomycin, or any other component of the vaccine; persons with a history of primary or acquired immunodeficiencies; persons on immunosuppressive therapy; pregnant women or women of childbearing age.
- A reduced immune response to ZOSTAVAX was observed in individuals who received concurrent administration of PNEUMOVAX®23 (Pneumococcal Vaccine Polyvalent) and ZOSTAVAX compared with individuals who received these vaccines 4 weeks apart. Consider administration of the two vaccines separated by at least 4 weeks.

Important Information About ZOSTAVAX® (Zoster Vaccine Live)

Select Safety Information ***(continued)***

- Serious vaccine-related adverse reactions that have occurred following vaccination with ZOSTAVAX include asthma exacerbation and polymyalgia rheumatica. Other serious adverse events reported following vaccination with ZOSTAVAX include cardiovascular events (congestive heart failure, pulmonary edema). Common adverse reactions occurring in ≥1% of vaccinated individuals during clinical trials include injection-site reactions (erythema, pain/tenderness, swelling, hematoma, pruritus, warmth) and headache.
- Transmission of vaccine virus may occur between vaccinees and susceptible contacts.
- Deferral should be considered in acute illness (for example, in the presence of fever) or in patients with active untreated tuberculosis.

Before administering ZOSTAVAX, please read the Prescribing Information available at this presentation.

Vaccination Opportunities Are Often Missed

- In a retrospective study of 1,878 adults with IPD, 1,177 had a vaccine indication and available health care utilization data in the 2 years prior to infection:[1]
  - 52% (617/1,177) were unvaccinated
  - 92% of unvaccinated cases (566/617) had at least 1 opportunity for vaccination[a]

Outpatient Setting	Hospital
• 77% had at least 1 outpatient visit • 76% saw their main health care provider	• 58% visited the ED • 54% were hospitalized at least once

ED=emergency department; IPD=invasive pneumococcal disease..

[a]An opportunity for vaccination was defined as having at least 1 health care encounter in the 2 years before the pneumococcal culture date. Some patients had both inpatient and outpatient health care encounters.

1. Kyaw MH et al. *Am J Prev Med*. 2006;31:286–292.

Health Care Provider Recommendations Play an Important Role in Adult Vaccination

- A key consideration for patients is a clear recommendation from their health care provider.[1,2]
- Vaccination rates may be improved by direct communication between providers and patients.[1,2]
- It is important to educate patients about the risks and benefits of vaccination[1,2] and to create a good interpersonal relationship characterized by mutual trust.[3]

1. Burns IT. *J Fam Pract.* 2005;54:S58–S62.
2. National Foundation for Infectious Diseases (NFID). Call To Action: Adult Vaccination Saves Lives. March 2012. www.adultvaccination.org/resources/cta-adult.pdf. Accessed April 20, 2012.
3. Thom DH et al. *Health Aff.* 2004;23:124–132.

- Providers must be **Advocates**
- Why aren't providers **Advocates**?
- "Show me the money"
- Patients must trust the provider

Interventions That Can Help Improve Vaccination Rates in Adults[1]

Component	Adjusted Odds Ratio
Organizational changes • Prevention and screening programs • Preventive care visits • Continuous quality improvement techniques • Designating preventive responsibilities to nonphysician staff (eg, standing orders)	16.0
Provider reminder • Paper or electronic	3.8
Provider education • Mailings, conferences, lectures	3.2
Patient reminder • Personalized reminders signed by patient's physician	2.5
Patient education • Mailings, conferences, lectures	1.3

1. Stone EG et al. *Ann Intern Med*. 2002;136:641–651.

- Vaccine tracking
- Vaccine Messaging
- Office vaccination activities and suggestions
- Faces of patients

Summary and Conclusions

- Despite ACIP recommendations, adult vaccination rates remain far below *Healthy People 2020* goals.
- There are vaccines available for adults that have the potential to reduce the burden of several infectious diseases.
- Opportunities exist for health care providers to make adult vaccination a fundamental part of routine patient care.

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